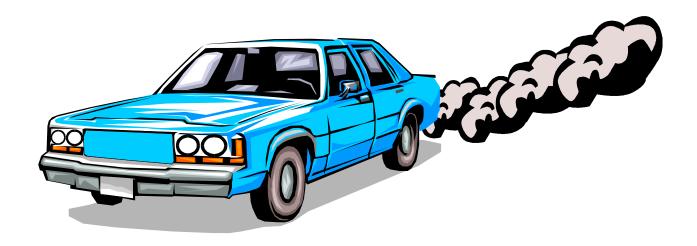


Annual Report FY04

July 1, 2003 – June 30, 2004 ADEQ Contract 99-0089

Environmental Services Department Community/Business Services Division

VOLUNTARY VEHICLE REPAIR AND RETROFIT PROGRAM



Executive Summary

The FY04 Annual Report (July 1, 2003 – June 30, 2004) for Maricopa County's Voluntary Vehicle Repair and Retrofit (VVR&R) Program continues to reflect a successful program. It achieves its goal of reducing vehicle emissions in a cost-effective manner. This program offers the citizens of Maricopa County the option to voluntarily repair and retrofit their highemitting or gross-emitting older vehicles with newer technology.

Summary of Results

Summary of Resums						
	FY04	FY04	FY04	FY04	FY04	FY03
	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Total	Total
Average Amount Spent by						
Customers & Maricopa	\$718	\$741	\$741	\$743	\$734	\$755
County Per Vehicle Repaired						
Average Amount Spent by						
Maricopa County Per Vehicle	\$493	\$513	\$493	\$502	\$499	\$493
Repaired						
Total Number of Vehicles						
Repaired	287	179	179	194	839	873
Number of Vehicles with						
Retrofit Kits Installed	6	5	2	6	19	26
Total Amount Spent by						
Customers & Maricopa	\$206,206	\$132,659	\$132,715	\$144,047	\$615,627	\$659,500
County for Vehicles Repaired						
Total Amount Spent by						
Maricopa County for	\$141,489	\$91,915	\$88,246	\$97,315	\$418,965	\$430,063
Vehicles Repaired						
Administrative Costs	\$32,502	\$38,072	\$50,532	47,503	168,609	\$220,460

Emissions Reductions

Basic Idle & Loaded Testing

Emissions reduction calculations vary depending on the type of test used. Older vehicles (1967 - 1980) and some newer trucks use the basic idle and loaded methods for emissions testing. Because of how the hydrocarbons and carbon monoxide are measured, there is not a formula available to determine cost effectiveness with these vehicles. Below is the average percent reduction for each pollutant:

	Idl	e Test	Loaded Test			
	HC	CO	HC	CO		
1 st Quarter FY04	69%	59%	47%	71%		
2 nd Quarter FY04	72%	62%	76%	76%		
3 rd Quarter FY04	85%	67%	71%	75%		
4 th Quarter FY04	72%	77%	72%	81%		
FY04 – Total	74%	65%	66%	75%		
FY03 – Total	78%	70%	64%	78%		

Emissions Reductions

IM Testing

Newer vehicles (1981 - 1992) calculate emissions using the IM test. The grid below shows the average percent reduction in pollutants:

	HC	CO	NOx
1 st Quarter FY04	74%	83%	53%
2 nd Quarter FY04	74%	81%	49%
3 rd Quarter FY04	74%	82%	54%
4 th Quarter FY04	75%	82%	51%
FY04 – Total	74%	82%	52%
FY03 – Total	74%	81%	52%

Because the IM test measures each pollutant in grams per mile, a cost effectiveness formula can be applied, taking into account the tons reduced and the average miles driven:

	FY04 1 st Qtr	FY04 2 nd Qtr	FY04 3 rd Qtr	FY04 4 th Qtr	FY04 Total	FY03 Total
Metric Tons Reduced	76	41	43	52	212	220
Maricopa County Cost Per						
Metric Ton	\$855	\$954	\$870	\$849	\$889	\$884
Customer & Maricopa						
County Cost Per Metric Ton	\$1,242	\$1,371	\$1,377	\$1,264	\$1,300	\$1,360

Costs are annualized over two years, assuming the VVR&R Program's benefits will be realized over at least that length of time. In comparison with other programs, it is generally assumed a program is cost effective if a ton of reduction costs \$2000.

Customer Satisfaction

Each customer is given a self-addressed stamped survey postcard after their vehicle is repaired. The customers rank the repair process and the service of the garage using the following scale:

- 1- Extremely Disagree
- 2- Disagree
- 3- No Opinion/Okay
- 4- Agree
- 5- Extremely Agree

Of the 839 vehicles repaired during FY04, 362 customers have returned their surveys resulting in a 43% response rate. The following chart reflects surveys received during FY04:

	Average FY04
Question	Score
When I initially called, the program was thoroughly explained.	4.57
My experience with the repair facility was satisfactory	4.69
I am satisfied with the repairs made to my vehicle.	4.64

Vehicle Repair Summary

The number of vehicles repaired and number of retrofit kits installed are detailed in the grid below for FY04 (July 2003 – June 2004) and for the program (July 2000 – March 2004).

	Number (of Vehicles	Number	of Retrofit
Vehicle Year	Rep	aired	Kits I	nstalled
	FY04	Program	FY04	Program
1967	3	16		
1968	3	14		
1969	4	17		
1970	2	14		
1971	3	14		
1972	6	30		
1973	5	27		
1974	11	24		
1975	3	20	2	13
1976	7	36	3	17
1977	4	35		16
1978	7	57	4	35
1979	14*	67	9	51
1980	7	46	1	27
1981	14	107		2
1982	18	103		
1983	32	175		1
1984	30	237		2
1985	52	347		
1986	98	526		
1987	65	494		1
1988	79	458		1
1989	71	410		2
1990	140	319		
1991	115	157		
1992	46	46		
Total	839	3,796	19	168

^{*}Includes one diesel subject to the opacity test.

Program Summary

	Dates	Number of Vehicles Repaired	Number of Retrofit Kits Installed	Metric Tons/Year Reduced	Cost Per Metric Ton
Pilot	1/99 - 6/00	1,662	37	425	\$591
Current Program	7/00 - 6/04	3,796	168	930	\$887

Funding History

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Year	Amount	Source
Pilot	\$640,000	SB1427
FY01	\$1,920,000	SB1504
FY01	\$92,800	ADEQ's Catalytic Converter Replacement Program
FY02	\$320,000	HB2538
FY03	-0-	HB2538 Allocation removed during Special
		Legislative Session
FY04	\$399,534	ADEQ Contract 99-0089 Amendment #7

Changes this Year

The Advisory Committee approved a clarification to program participation. Participation in the program is limited to one vehicle per owner. Confusion existed as to whether the same owner can bring the same vehicle through the program more than once.

The Advisory Committee determined that since the intent of the program is to reduce tailpipe emissions on as many vehicles as possible, eligibility was extended to include the same owner entering the same vehicle through the program more than once. To be eligible for re-entry to the program, all program parameters apply plus a minimum of two years must have elapsed since previously entering the program. As per statute, an individual will not be permitted to enter a different vehicle in the program once that individual has previously utilized the program.

This change was effective February 9, 2004. 24 vehicles re-entered the program for a second time during FY04.

In addition, the Agreement Sheet signed by the customer was updated to reflect this change.

Program Parameters

In order to qualify for the program, vehicles must meet the following criteria established by ARS § 49-474.03 and the VVR&R Program's Advisory Committee:

- The owner must be willing to participate and the vehicle must be functionally operational
- The vehicle must be titled in Arizona
- The vehicle must have been registered during the immediately preceding 12 months. It cannot have been unregistered for more than 60 days

- The vehicle must have failed a required emissions test in the "Emissions Inspection Results" within the past 60 days; failures in the "Equipment or Pressure & Purge Inspection Results" are not eligible
- The emissions control system has not been tampered with, removed, or disabled
- Work must be done at a participating garage
- One vehicle per owner
- Motor homes, motorcycles, salvage vehicles and fleet vehicles are not eligible
- If the vehicle is eligible for a retrofit kit (most 1975-1980 vehicles and some newer model year trucks), one must be installed
- There are no reimbursements available for work already done
- Some vehicles may not be eligible for assistance if they are in extremely poor condition

Process

The primary method of communication regarding this program is located on various pamphlets people receive as they proceed through the registration and emissions testing process. Information on the program is included on the pamphlet entitled "Car Care – Important Emissions Testing Information" which is sent to all owners due to re-register their vehicles.

If they fail the emissions test, customers receive a pamphlet from the emissions station entitled "Car Care – Failed Vehicle Information." In addition, banners have been installed at each of Maricopa County's thirteen testing stations. Customers may call the VVR&R helpline or go directly to the website to find a participating repair facility.

When customers take their vehicle to the repair facility, they bring their title, current proof of registration, and the emissions failure notice. Customers sign an agreement sheet and a diagnostic is performed. The customers are informed about necessary repairs and associated costs. If customers continue in the program, they pay the first \$150 to the repair facility. Maricopa County Environmental Services Department pays an additional \$550 for repairs to address the specific emission failure or an additional \$650 for repair and retrofit kit installation. If the cost to bring the vehicle to emission standards exceeds these amounts, owners may pay the additional money or withdraw their vehicle from the program. If they choose to withdraw from the program, they are charged a \$50 diagnostic fee.

Repairs generally take a day, after which the mechanic takes the vehicle to an emission station to obtain a pass notice. The facility forwards all paperwork (invoices with balances noted, copies of title, registration, failure and pass notices) to Kachina Automotive. Kachina Automotive then submits copies of this information, along with a final invoice, to the County. The County pays Kachina who then distributes payment to each repair facility.

Checks & Balances

A system of checks and balances has been established, with the help of the State of Arizona Waiver Facilities, to ensure repairs are properly completed as indicated on the invoices and money is spent appropriately. Each customer is given a self-addressed stamped postcard with survey questions on the process and the service, allowing the program to gather immediate feedback. If customers call with complaints, they may be referred to a waiver station. There,

technicians compare the invoiced repairs with what was actually done to the vehicles and test the vehicles to be sure they are passing the emissions test. Most vehicles receive positive reports from the waiver stations. Those that do not are referred back to the garages; to this point, all vehicles have been repaired to everyone's satisfaction.

Retrofit Kits

The retrofit kits utilized in this program are supplied by Neutronics Enterprises, Inc. The kit converts vehicles originally built with open loop carburetor or fuel injection systems and oxidation catalysts into closed-loop (feedback) systems with three-way catalysts. The Neutronics representative in Maricopa County is Kachina Automotive Equipment, Inc., responsible for maintaining an inventory of the retrofit kits. In addition, Maricopa County subcontracts with Kachina to oversee all aspects of selecting and training repair facilities. The VVR&R Program currently has six repair facilities in the Valley: in Avondale, Mesa, Central Phoenix, North Phoenix, North-East Phoenix, and Central-West Phoenix.

Advisory Committee

The Advisory Committee, established under ARS § 49-588.34, meets as needed to advise and make recommendations on the development and implementation of the VVR&R Program. Members include representatives from the Arizona Department of Transportation, the Arizona Department of Environmental Quality, automobile hobbyists, and the automotive aftermarket products industry.

Maricopa County's Voluntary Vehicle and Retrofit Program IM147 Emission Reduction Results - FY04 July 2003 through June 2004

	Total # of		Before (gram		Total After (grams/mile)			Total Reduction (grams/mile)			Total Reduction (%)			Average Miles per	Total Redu
	Vehicles	HC	CO	Nox	HC	CO	Nox	HC	CO	Nox	HC	CO	Nox	Year*	HC
Total	746	1,550.54	28,329.54	1,959.06	399.10	5,036.75	934.92	1,151.44	23,292.79	1,024.14	74.26	82.22	52.28	96,511	9.61
1981	13	42.04	899.00	24.72	9.75	193.70	21.94	32.29	705.30	2.78	76.81	78.45	11.25	5,997	0.19
1982	18	47.35	759.94	46.22	13.89	214.43	24.41	33.46	545.51	21.81	70.67	71.78	47.19	6,308	0.21
1983	31	77.95	1,776.69	84.46	25.78	359.08	45.15	52.17	1,417.61	39.31	66.93	79.79	46.54	6,636	0.35
1984	30	92.37	1,875.17	87.00	25.91	385.10	55.66	66.46	1,490.07	31.34	71.95	79.46	36.02	6,980	0.46
1985	51	140.90	2,874.33	150.58	36.03	488.71	83.81	104.87	2,385.62	66.77	74.43	83.00	44.34	7,342	0.77
1986	92	211.16	3,924.71	236.43	55.89	649.43	132.03	155.27	3,275.28	104.40	73.53	83.45	44.16	7,723	1.20
1987	65	143.12	2,727.37	176.75	36.12	431.05	88.91	107.00	2,296.32	87.84	74.76	84.20	49.70	8,124	0.87
1988	78	207.89	3,686.27	189.52	42.89	546.82	96.24	165.00	3,139.45	93.28	79.37	85.17	49.22	8,546	1.41
1989	71	161.31	2,465.39	182.76	36.33	446.14	90.95	124.98	2,019.25	91.81	77.48	81.90	50.24	8,989	1.12
1990	138	213.90	3,680.98	338.23	55.27	614.18	138.77	158.63	3,066.80	199.46	74.16	83.31	58.97	9,456	1.50
1991	113	151.56	2,426.21	306.31	43.13	497.84	116.35	108.43	1,928.37	189.96	71.54	79.48	62.02	9,947	1.08
1992	46	60.99	1233.48	136.08	18.11	210.27	40.70	42.88	1,023.21	95.38	70.31	82.95	70.09	10,463	0.45

^{*}For ease in calculations, only light duty gas vehicle mileage is used. This information is generated from the Mobile6 model.

Maricopa County's Voluntary Vehicle and Retrofit Program IM147 Emission Reduction Results - FY04 July 2003 through June 2004

		Total Reduction	M	aricopa County Cos	sts	Total Co	Total Cost (County + Customer)			
ction (metric	tons/year)	Per Vehicle Year	Total Cost Per	Cost Per Metric	Average Cost of	Total Cost Per	Cost Per	Average Cost		
CO	Nox	(metric tons/year)	Vehicle Year	Ton**	Repair	Vehicle Year	Metric Ton**	of Repair		
192.81	9.04	211.47	\$376,015	\$889	\$504	\$549,725	\$1,300	\$737		
4.23	0.02	4.44	\$6,223	\$701	\$479	\$9,893	\$1,114	\$761		
3.44	0.14	3.79	\$9,010	\$1,189	\$501	\$12,927	\$1,706	\$718		
9.41	0.26	10.01	\$16,029	\$800	\$517	\$23,364	\$1,167	\$754		
10.40	0.22	11.08	\$15,483	\$698	\$516	\$23,591	\$1,064	\$786		
17.52	0.49	18.78	\$25,958	\$691	\$509	\$40,209	\$1,071	\$788		
25.29	0.81	27.30	\$45,268	\$829	\$492	\$68,780	\$1,260	\$748		
18.66	0.71	20.24	\$34,017	\$840	\$523	\$49,232	\$1,216	\$757		
26.83	0.80	29.04	\$38,750	\$667	\$497	\$56,510	\$973	\$724		
18.15	0.83	20.10	\$36,517	\$908	\$514	\$53,274	\$1,325	\$750		
29.00	1.89	32.39	\$68,939	\$1,064	\$500	\$97,939	\$1,512	\$710		
19.18	1.89	22.15	\$57,188	\$1,291	\$506	\$81,721	\$1,845	\$723		
10.71	1.00	12.15	\$22,633	\$931	\$492	\$32,285	\$1,328	\$702		

^{**}This is cost annualized over two years. It is assumed benefits, though paid for in one year, will be realized over two or more years.

Maricopa County's Voluntary Vehicle Repair and Retrofit Program Loaded Emission Reduction Results - FY04 July 2003 through June 2004

		Total B	efore	Total /	After	Total Re	duction	Total Re	eduction (%)	Maricopa Co	ounty Costs	Total Cos	ts (County +
	Total # of			Load		Load			oaded		Average		tomer)
		HC (ppm)	` '	HC (ppm)	CO (%)	HC (ppm)		HC (ppm)	CO (%)	Total Cost	Cost	Total Cost	Average Cost
Total	92	25,230.00	284.77	8,563.00	70.99	16,667.00	213.78	66.06	75.07	\$42,802	\$465	\$65,610	\$713
1967	3	694.00	16.03	542.00	3.18	152.00	12.85	21.90	80.16	\$1,174	\$391	\$1,624	\$541
1968	3	1,519.00	6.96	509.00	4.23	1,010.00	2.73	66.49	39.22	\$1,333	\$444	\$1,811	\$604
1969	4	1,185.00	22.98	768.00	8.70	417.00	14.28	35.19	62.14	\$1,469	\$367	\$2,142	\$536
1970	2	382.00	4.82	316.00	5.32	66.00	-0.50	17.28	-10.37	\$681	\$341	\$999	\$500
1971	3	1,097.00	11.94	423.00	3.80	674.00	8.14	61.44	68.17	\$1,195	\$398	\$1,664	\$555
1972	6	2,194.00	15.51	744.00	2.48	1,450.00	13.03	66.09	84.01	\$2,424	\$404	\$4,852	\$809
1973	5	1,755.00	24.72	658.00	5.95	1,097.00	18.77	62.51	75.93	\$2,464	\$493	\$3,523	\$705
1974	11	3,809.00	40.65	1,832.00	16.01	1,977.00	24.64	51.90	60.62	\$3,072	\$279	\$8,268	\$752
1975	3	687.00	9.22	87.00	0.03	600.00	9.19	87.34	99.67	\$1,839	\$613	\$2,739	\$913
1976	7	1,780.00	21.21	500.00	4.71	1,280.00	16.50	71.91	77.79	\$3,910	\$559	\$5,963	\$852
1977	4	637.00	10.55	304.00	3.04	333.00	7.51	52.28	71.18	\$1,971	\$493	\$2,720	\$680
1978	7	1,399.00	23.06	586.00	2.34	813.00	20.72	58.11	89.85	\$3,704	\$529	\$4,773	\$682
1979	13	2,482.00	20.68	384.00	1.63	2,098.00	19.05	84.53	92.12	\$7,852	\$604	\$10,259	\$789
1980	7	1,439.00	26.00	102.00	0.19	1,337.00	25.81	92.91	99.27	\$3,344	\$478	\$4,661	\$666
1981	1	100.00	1.03	45.00	0.69	55.00	0.34	55.00	33.01	\$162	\$162	\$312	\$312
1983	1	172.00	3.69	96.00	1.98	76.00	1.71	44.19	46.34	\$231	\$231	\$400	\$400
1985	1	46.00	0.12	67.00	0.10	-21.00	0.02	-45.65	16.67	\$528	\$528	\$678	\$678
1986	6	2,527.00	9.12	333.00	5.28	2,194.00	3.84	86.82	42.11	\$2,953	\$492	\$4,305	\$718
1988	1	365.00	2.21	25.00	0.00	340.00	2.21	93.15	100.00	\$550	\$550	\$967	\$967
1990	2	549.00	5.64	63.00	0.25	486.00	5.39	88.52	95.57	\$1,100	\$550	\$1,529	\$765
1991	2	412.00	8.63	179.00	1.08	233.00	7.55	56.55	87.49	\$846	\$423	\$1,421	\$711

Maricopa County's Voluntary Vehicle Repair and Retrofit Program Idle Emission Reduction Results - FY04 July 2003 through June 2004

		Total	Before	Total After Total Reduction		duction	Total Reduction (%)		Maricopa County Costs		Total Costs (County +		
	Total # of		dle	Idle		Idle			dle		Average	Cus	tomer)
		HC (ppm)	CO (%)	HC (ppm)	. ,	HC (ppm)		HC (ppm)	CO (%)	Total Cost	Cost	Total Cost	Average Cost
Total	92	43,731.00	303.55	11,529.00	104.92	32,202.00	198.63	73.64	65.44	\$42,802	\$465	\$65,610	\$713
1967	3	1,213.00	24.38	693.00	10.54	520.00	13.84	42.87	56.77	\$1,174	\$391	\$1,624	\$541
1968	3	1,891.00	14.90	821.00	10.66	1,070.00	4.24	56.58	28.46	\$1,333	\$444	\$1,811	\$604
1969	4	1,739.00	18.79	782.00	3.33	957.00	15.46	55.03	82.28	\$1,469	\$367	\$2,142	\$536
1970	2	1,637.00	3.94	313.00	5.19	1,324.00	-1.25	80.88	-31.73	\$681	\$341	\$999	\$500
1971	3	1,948.00	11.33	741.00	9.52	1,207.00	1.81	61.96	15.98	\$1,195	\$398	\$1,664	\$555
1972	6	4,431.00	16.26	1,255.00	9.45	3,176.00	6.81	71.68	41.88	\$2,424	\$404	\$4,852	\$809
1973	5	2,310.00	16.16	873.00	8.80	1,437.00	7.36	62.21	45.54	\$2,464	\$493	\$3,523	\$705
1974	11	6,314.00	59.35	2,183.00	16.85	4,131.00	42.50	65.43	71.61	\$3,072	\$279	\$8,268	\$752
1975	3	1,453.00	9.29	99.00	0.01	1,354.00	9.28	93.19	99.89	\$1,839	\$613	\$2,739	\$913
1976	7	2,489.00	26.39	787.00	5.48	1,702.00	20.91	68.38	79.23	\$3,910	\$559	\$5,963	\$852
1977	4	1,150.00	4.58	517.00	4.79	633.00	-0.21	55.04	-4.59	\$1,971	\$493	\$2,720	\$680
1978	7	1,647.00	16.40	743.00	4.62	904.00	11.78	54.89	71.83	\$3,704	\$529	\$4,773	\$682
1979	13	5,080.00	24.22	563.00	2.23	4,517.00	21.99	88.92	90.79	\$7,852	\$604	\$10,259	\$789
1980	7	3,216.00	19.61	56.00	0.00	3,160.00	19.61	98.26	100.00	\$3,344	\$478	\$4,661	\$666
1981	1	572.00	4.79	56.00	1.21	516.00	3.58	90.21	74.74	\$162	\$162	\$312	\$312
1983	1	1,270.00	0.07	65.00	0.00	1,205.00	0.07	94.88	100.00	\$231	\$231	\$400	\$400
1985	1	392.00	0.22	62.00	0.63	330.00	-0.41	84.18	-186.36	\$528	\$528	\$678	\$678
1986	6	2,897.00	15.79	730.00	10.37	2,167.00	5.42	74.80	34.33	\$2,953	\$492	\$4,305	\$718
1988	1	302.00	3.03	32.00	0.00	270.00	3.03	89.40	100.00	\$550	\$550	\$967	\$967
1990	2	852.00	2.00	20.00	0.16	832.00	1.84	97.65	92.00	\$1,100	\$550	\$1,529	\$765
1991	2	928.00	12.05	138.00	1.08	790.00	10.97	85.13	91.04	\$846	\$423	\$1,421	\$711